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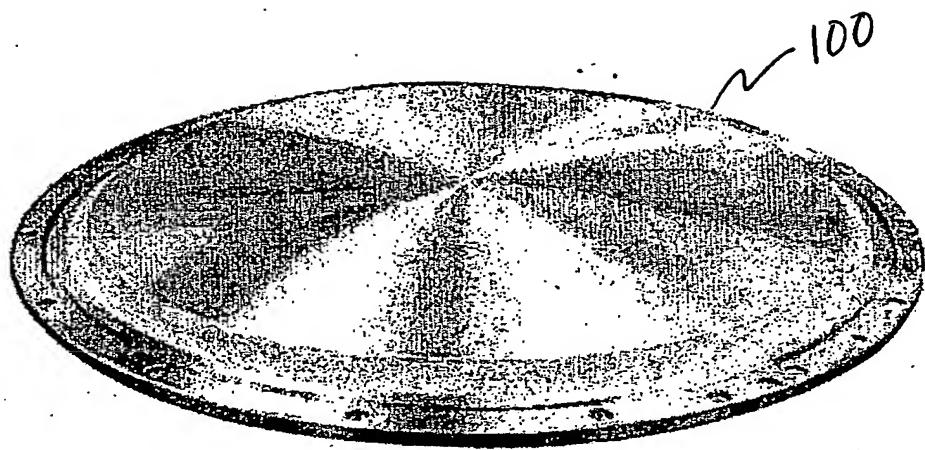


Fig 1. Photo of new target - showing original flat surface of the target and the attached backing plate.

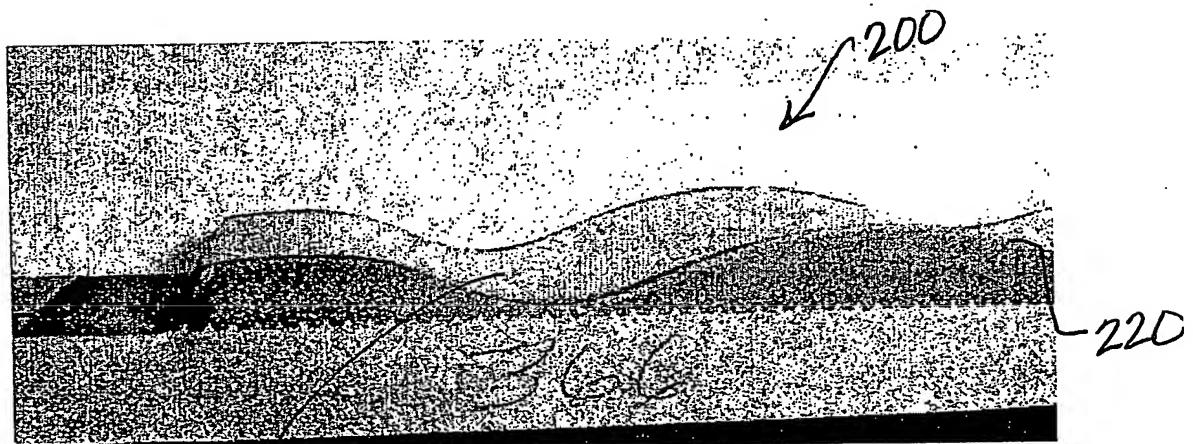
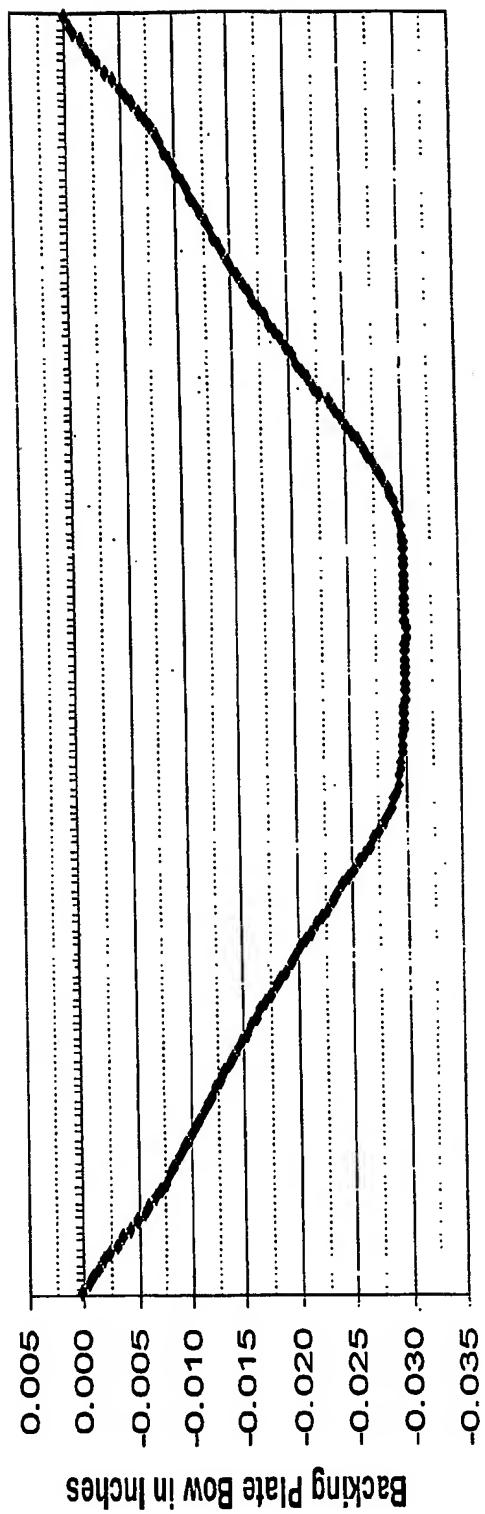


Fig 2. Photo of a non-uniformly worn sputter target

1051.9 kwhrs  
Maximum bow @ 0.030"

Figure 3

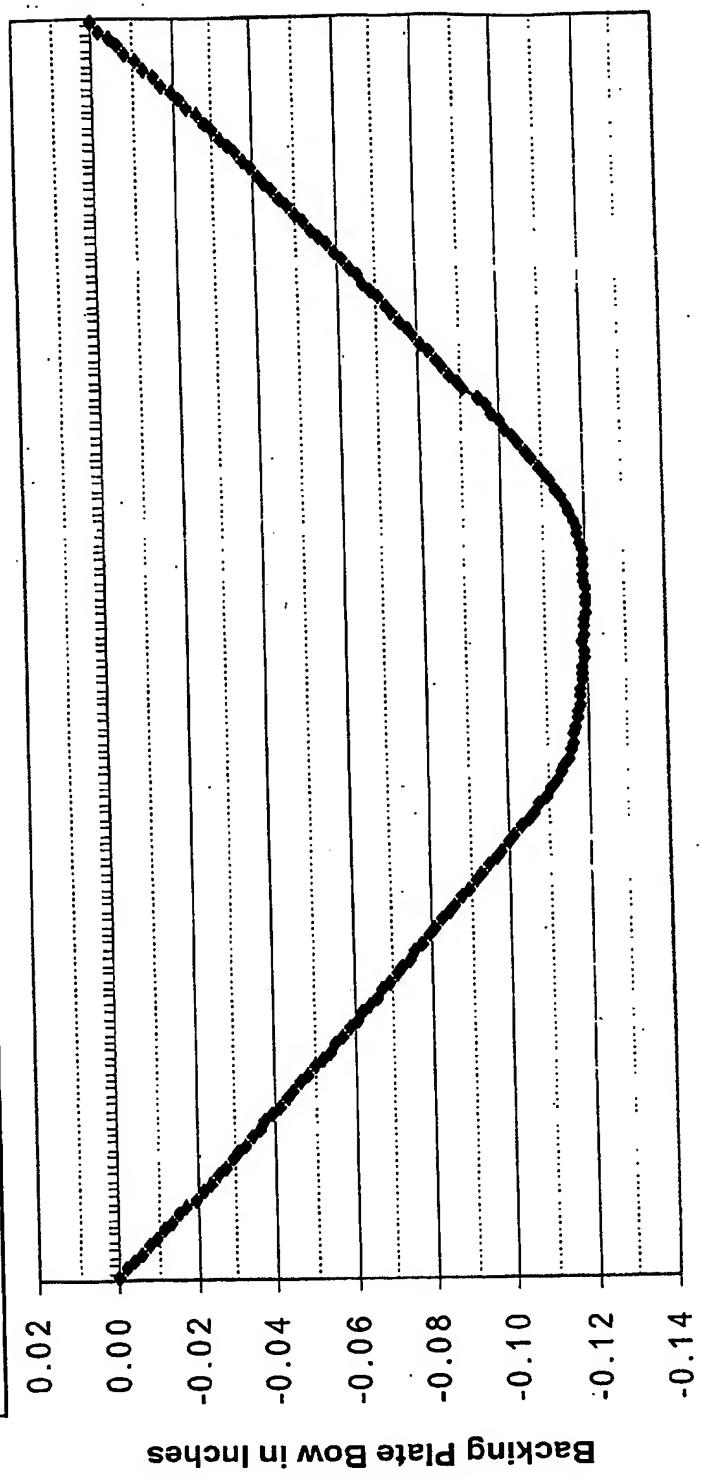


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**Figure 4**

**850 kWhrs**  
**0.120" maximum bow**



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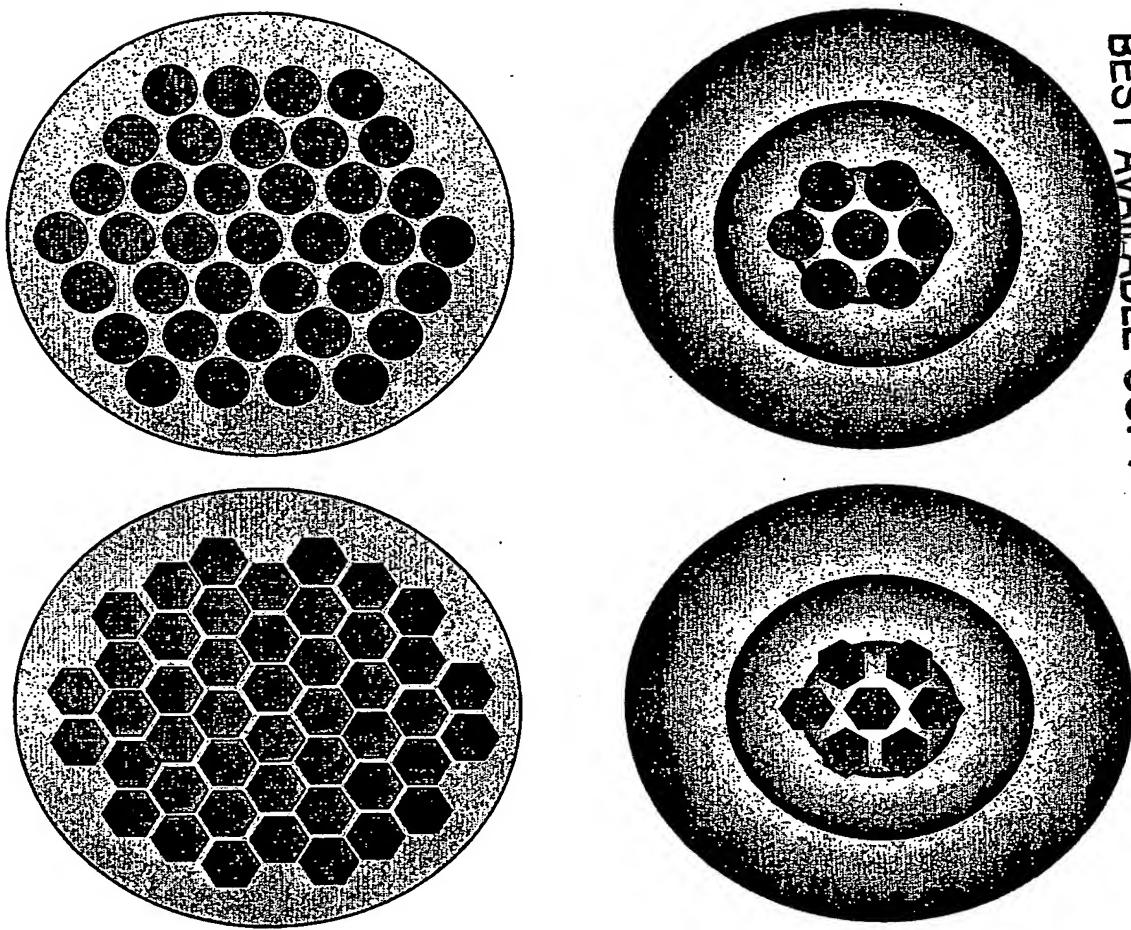
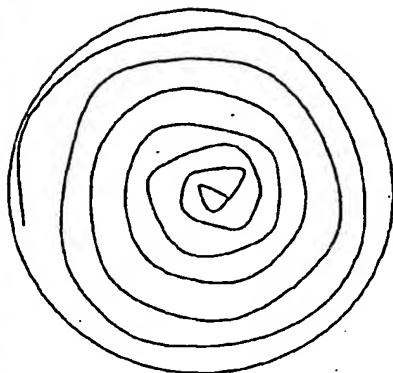
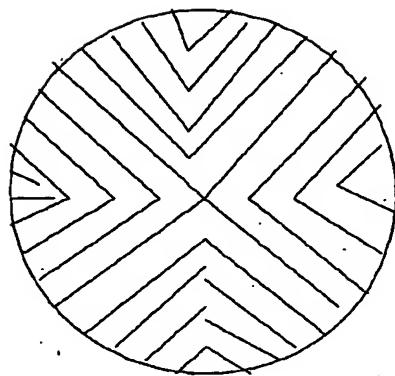


Fig. 5 showing other core backing component configurations to increase surface area by surface area modification.

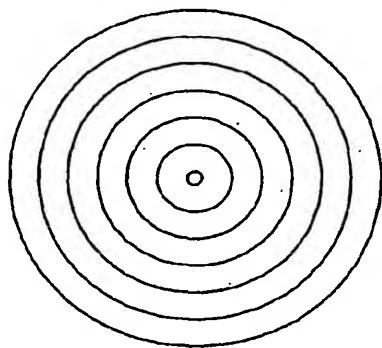
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Spiral

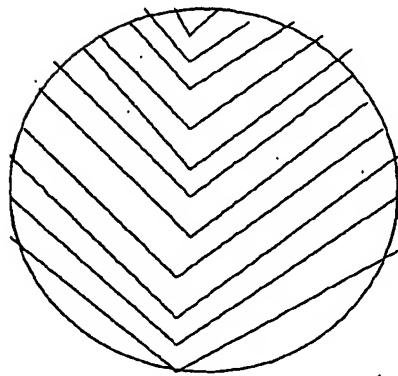


"Center" Chevron



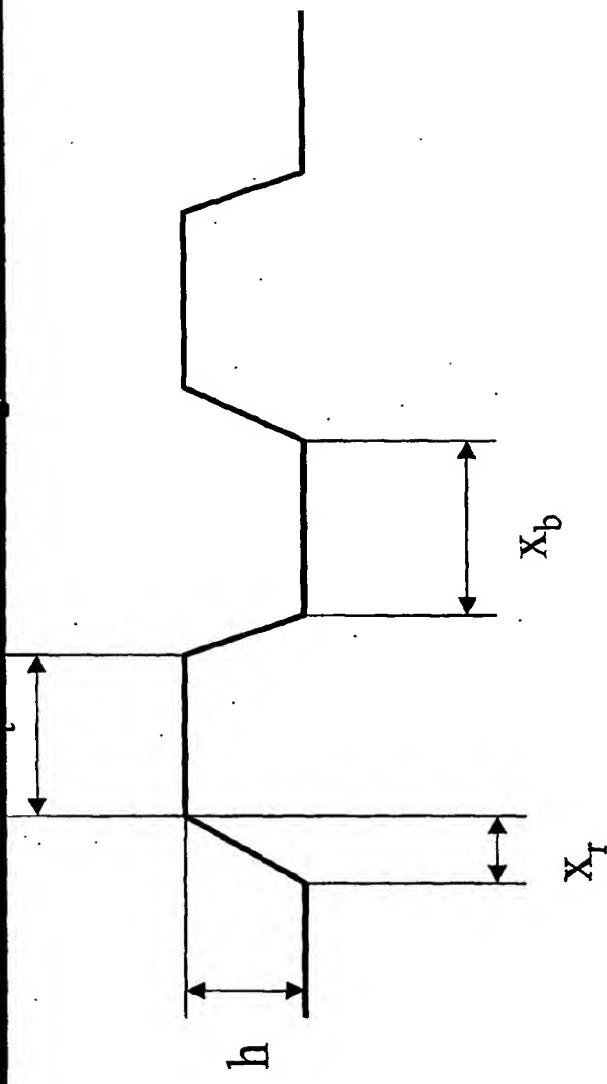
Concentric Grooves

Design #1 and #2



"Side" Chevron

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Design 1:

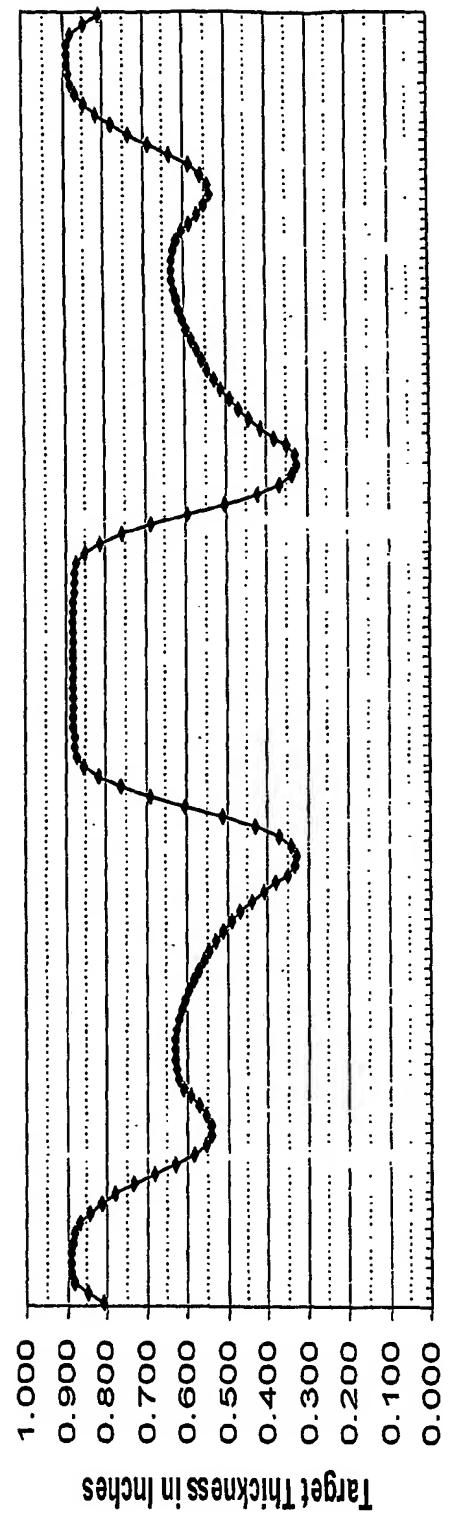
$$\begin{aligned}
 h &= 2.0 \text{ mm (0.08")} \\
 x_t &= 3.0 \text{ mm} \\
 x_b &= 3.0 \text{ mm} \\
 x_t &= 1.0 \text{ mm}
 \end{aligned}$$

Design 2:

$$\begin{aligned}
 h &= 2.0 \text{ mm (0.08")} \\
 x_t &= 4.0 \text{ mm} \\
 x_b &= 2.0 \text{ mm} \\
 x_t &= 0.5 \text{ mm}
 \end{aligned}$$

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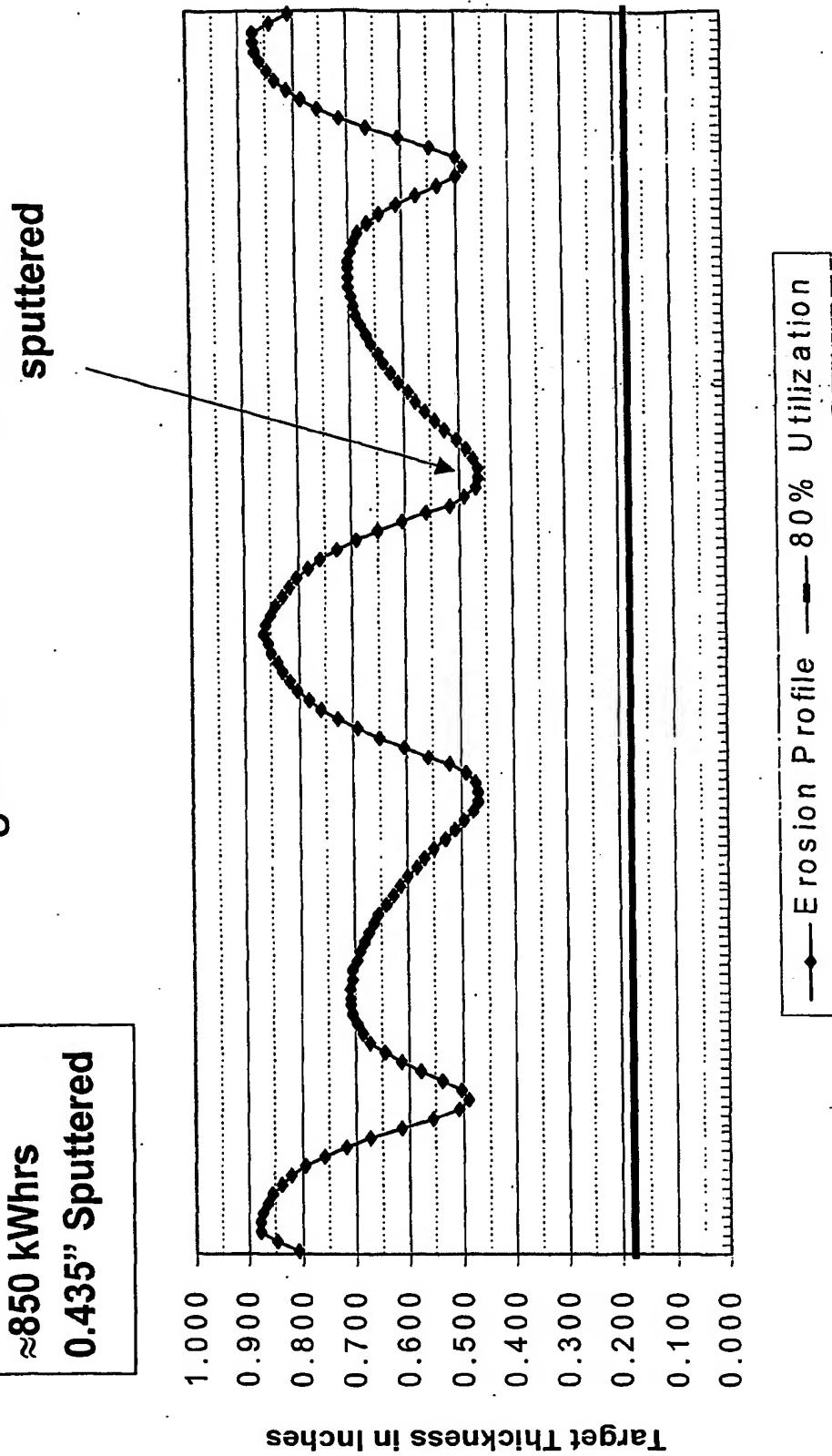
Figure 8  
Erosion Profile

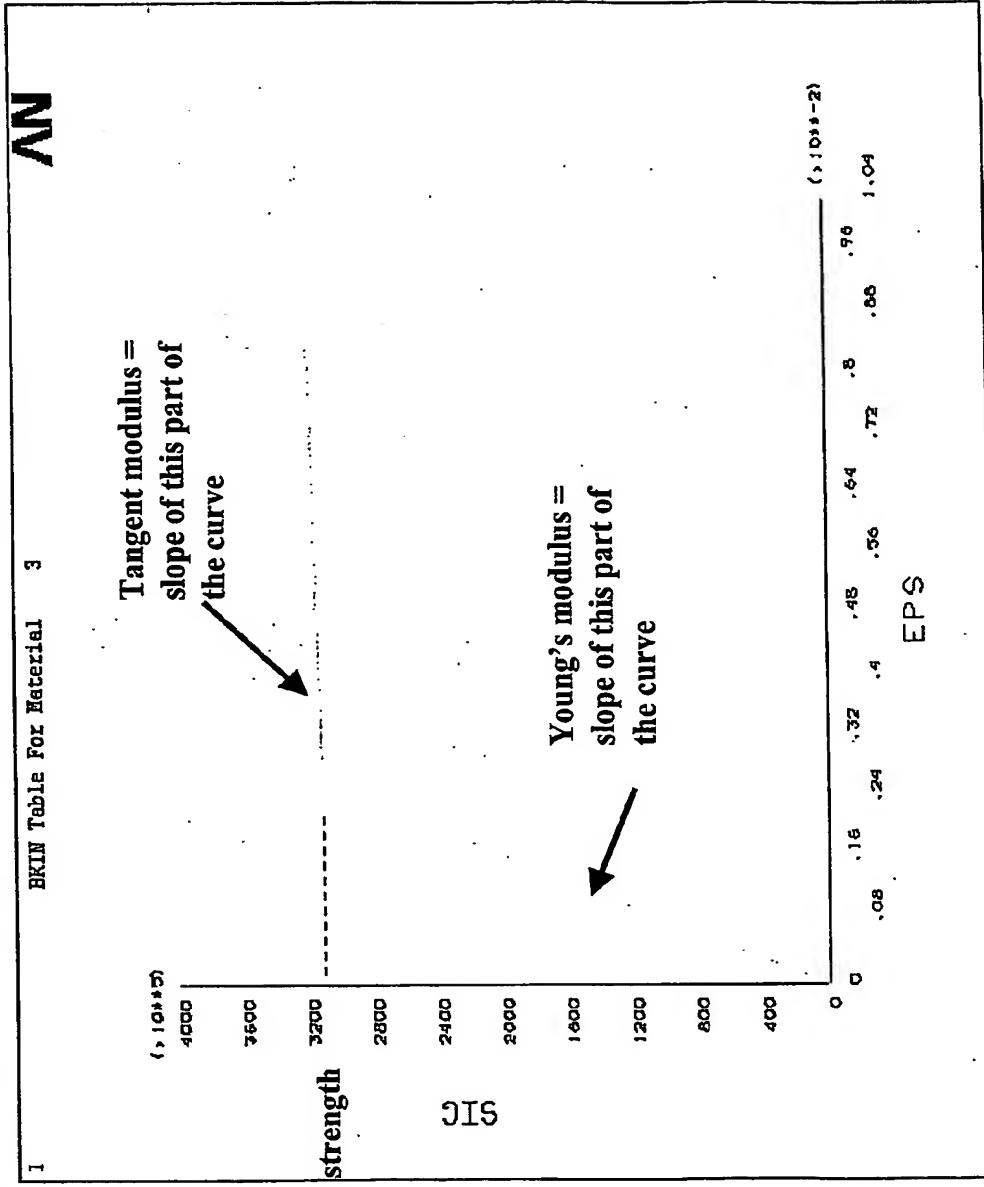


1051.9 kwhrs  
0.600" Sputtered

≈850 kWhrs  
0.435" Sputtered

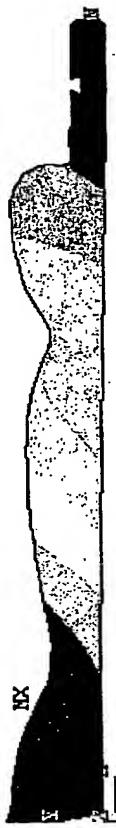
Figure 9





850 kWhrs

temperature distribution:



DMX = .003093  
SMX = 47.906  
SMX = 166.674  
47.906  
61.103  
74.299  
87.495  
100.692  
113.888  
127.085  
140.281  
153.478  
166.674

Monolithic - APEX



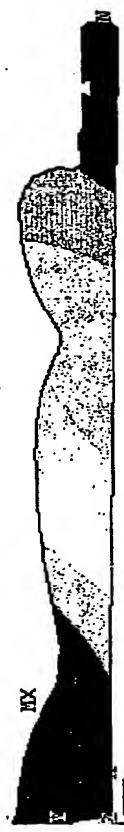
DMX = .002672  
SMX = 42.832  
SMX = 146.821  
42.832  
54.386  
65.941  
77.495  
89.049  
100.604  
112.158  
123.712  
135.267  
146.821

Enhanced cooling design 1 - APEX

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850 kWhrs

temperature distribution:



$\Delta T_{\text{MAX}} = .0003093$

$SUM = 47.906$

$SUM = 166.674$

47.906

61.103

74.299

87.495

100.692

113.888

127.085

140.281

153.478

166.674

### Monolithic - APEX



$\Delta T_{\text{MAX}} = .00256$

$SUM = 41.447$

$SUM = 140.181$

41.447

52.418

63.388

74.358

85.329

96.299

107.269

118.24

129.21

140.181

### Enhanced cooling design 2 - APEX

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DMX = .002873

SMN = 47.906

SMX = 166.674

47.906

61.103

74.299

87.495

100.692

113.888

127.085

140.281

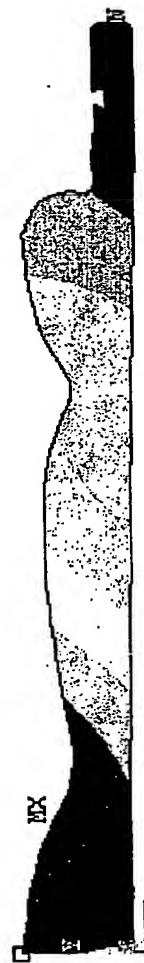
153.478

166.674

temperature distribution:

**850 kWhrs**

.002873

**Monolithic ECAE**

DMX = .003123

SMN = 45.675

SMX = 178.473

45.675

60.43

75.186

89.941

104.696

119.452

134.207

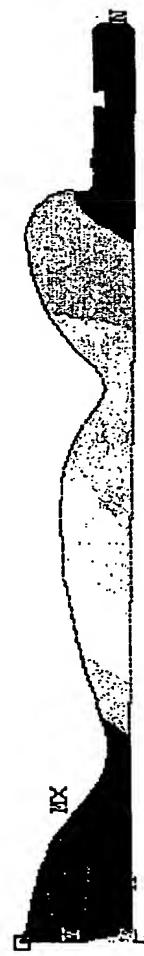
148.952

163.718

178.473

**1400 kWhrs**

.003123

**Monolithic ECAE**

850 kWhrs

temperature distribution:



Enhanced cooling design 2 - ECAE



Enhanced cooling design 2 - APEX

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**1400 kWhrs**

temperature distribution:

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